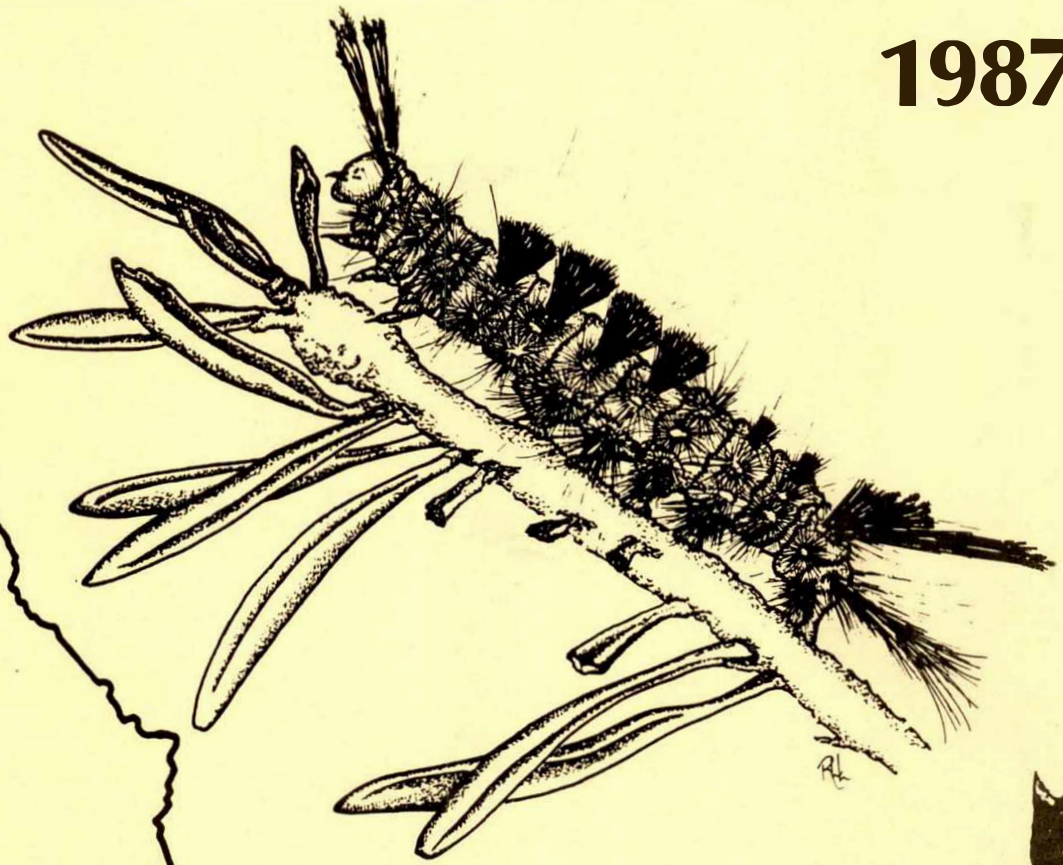
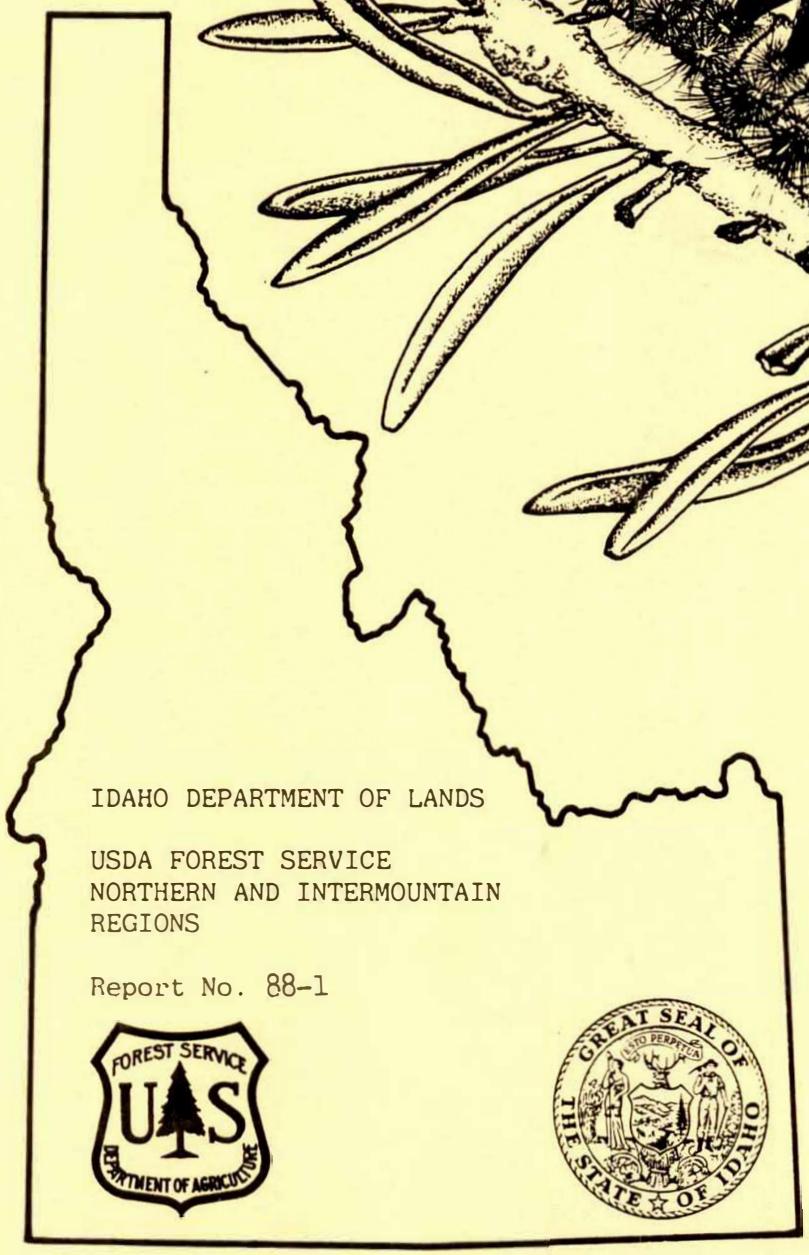
IDAHO FOREST PEST CONDITIONS & PROGRAM SUMMARY

1987





IDAHO DEPARTMENT OF LANDS

USDA FOREST SERVICE
NORTHERN AND INTERMOUNTAIN
REGIONS

Report No. 88-1

IDAHO FOREST PEST CONDITIONS

AND

PROGRAM SUMMARY

1987

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INTRODUCTION

This report summarizes the results of aerial and ground surveys and associated activities by pest management personnel within the Idaho Department of Lands (IDL) and the Northern and Intermountain Regions, USDA Forest Service, during 1987. Major insect and disease damage on forested lands of all ownerships within the state is described. Tables indicate the amount of damage. Maps show the location of major insect infestations (Appendix). Tree mortality counts in the tables are estimates. Location and trend of damage from year to year can be determined by comparing maps and mortality estimates from previous reports.

CONDITIONS IN BRIEF

Insects

Overall, mountain pine beetle activity decreased statewide. However, several sites in northern Idaho have shown increases in the number of attacks, specifically in the lodgepole pine stands of the Red River Ranger District, Nez Perce National Forest, and on adjacent state and private lands, as well as on the Bonners Ferry Ranger District of the Idaho Panhandle National Forest. The Douglas-fir beetle activity has increased again for the second year with 55,821 trees recorded in 1987 compared to 9,382 in 1986. Spruce beetle-caused mortality has increased slightly in 1987. Pine engraver and western pine beetle activity has increased significantly in both northern and southern Idaho. In northern Idaho, fir engraver activity has also increased dramatically.

Western spruce budworm defoliation has increased in northern Idaho but decreased in southern Idaho. Larch casebearer and Douglas-fir tussock moth populations are at very low levels. The gypsy moth pheromone trapping survey showed a significant increase in moths caught; 1 in 1986 compared to 1987 catches of 22 in Sandpoint, 11 in Coeur d'Alene, 1 in Lewiston, and 1 in Cascade. Several other insects, including the balsam woolly adelgid, the forest tent caterpillar, and the California tortoiseshell also increased in activity.

Diseases

Root diseases and white pine blister rust continue to be the most perplexing disease problems in north Idaho while dwarf mistletoes are a major concern in southern Idaho. Several projects to evaluate effects of silvicultural treatments on root disease occurrence and spread were continued during 1987. Progress is being made on developing a root disease model which will link to the Prognosis growth model, and a guide for estimating blister rust hazard is in the final stages of preparation.

An unusually hot period of weather in early spring followed by a severe drought through July caused the foliage to dry out and resulted in premature needle shed of older needles in many species throughout the state. However, this weather pattern was not conducive to the spread of needle cast fungi, thus incidence of needle casts were generally lower than last year. The only major needle cast problems were where the infections had taken place during the prior year.

Nursery diseases continue to be a major concern as demand for seedlings continues to grow. Fungi-causing disease problems in 1987 include the following: Fusarium, Botrytis, Meria, Sirococcus, Diplodia, and Phoma.

INSECTS

BARK BEETLES

Mountain Pine Beetle

In total, beetle activity in northern Idaho decreased slightly in 1987. Faded trees, those attacked and killed in 1986, of all species and on all ownerships, were recorded on about 14,400 acres. In 1986, the infested area was more than 16,500 acres. Slight increases were noted in some areas such as on the Bonners Ferry Ranger District (RD) of the Idaho Panhandle National Forest (NF). Notable increases were observed in lodgepole pine stands on the Red River RD, Nez Perce NF, and surrounding State and private lands. A significant decrease in infested acres was recorded in the Craig Mountains south of Lewiston.

On the West Fork RD, Bitterroot NF, the infestation in lodgepole pine within the Frank Church-River of No Return Wilderness near Dennis Mountain increased to 2,880 acres in 1987. Slightly less than 2,700 acres had shown beetle-killed trees in 1986.

High-risk lodgepole pine stands in the Boulder Creek drainage, Bonners Ferry RD, continued to experience beetle-caused mortality. In 1986, only 58 acres were recorded as infested. By 1987, 413 acres showed faded lodgepole pines. Ground surveys conducted at a few sites in the drainage confirmed the infestation is continuing to build. Currently infested trees averaged 22 per acre--up from 14 per acre in 1986.

On the Nez Perce NF, the beetle epidemic recorded yearly since 1974 in the vicinity of Elk City and Red River continued. Though down slightly around Elk City, stands on the Red River RD and adjacent lands showed increases in infested acres. Forest-wide infested acres increased from 5,950 in 1986 to nearly 7,500 in 1987. Ground surveys indicated a decline in infested trees near Elk City--from 6 trees per acre last year to 3 trees per acre in 1987. Similar surveys on the Red River RD showed increases of 11 to 16 currently infested trees per acre. Other host species, ponderosa pine and western white pine, were affected in minor amounts throughout the forest. More than 300

acres of whitebark pine were killed by the beetle on the Salmon River RD near John Day Mountain.

The infestation in the Craig Mountains near Soldiers Meadow Reservoir, having existed for nearly ten years, is finally declining. Much of the susceptible host, both lodgepole and ponderosa pines, has been killed. A 50 percent decrease in infested acres--down to slightly more than 3,200 acres (both species)--was noted between 1986 and 1987.

Aerial surveys were flown for the following fire protection districts in 1987: Cataldo, Clearwater/Potlatch, Kendrick, Maggie Creek, Mica, and West St. Joe. Only minor amounts of widely scattered tree mortality attributable to mountain pine beetle were noted. Affected areas combined on all units totalled less than ten acres.

Static to increasing levels of mountain pine beetle activity occurred on all national forests in southern Idaho, except the Caribou National Forest where mortality decreased substantially. Approximately 26,800 trees were killed in 1987 compared to 18,300 trees killed in 1986. Significant infestations are located near Lost Basin, near Deadwood Reservoir, and along the headwaters of Trinity Creek on the Boise National Forest, along Squaw Creek on the Challis National Forest, and throughout the Big Wood River drainage and Sawtooth Valley on the Sawtooth National Forest. During the 1987 aerial survey of the Salmon National Forest, lodgepole pine mortality on the perimeter of recent burns was attributed to mountain pine beetle; however, subsequent ground surveys revealed that this mortality is primarily a result of fire scorch and opportunistic attacks by pine engraver beetles. Mountain pine beetle is causing relatively minor damage adjacent to these burns. Only minimal activity was observed on the Payette and Targhee National Forests.

Specific mortality figures summarized from aerial detection surveys are displayed in Table 1.

Douglas-Fir Beetle

Statewide, the Douglas-fir beetle-caused mortality increased again for the second year. Severe mortality has taken place with 55,821 trees being killed in 1987 compared to 9,382 in 1986 (Table 1)--nearly a 600 percent increase. Most of the increased activity took place in northern Idaho. This large scale population increase has been stimulated by windthrown and snow-damaged trees that resulted from storms in the winter of 1984-1985. Many large and small, damaged or blown over trees provided a large increase of food available to the beetles. The beetle populations increased, and a high number of large, old-growth Douglas-fir were attacked in 1986 and at even higher levels in 1987. Ground surveys found many, large Douglas-fir beetle-attacked groups during the summer of 1987. The success of the 1986 and 1987 beetle populations was enhanced by early, warmer than normal, spring weather. Beetles were observed making attacks in early April. This is at least a month earlier than usual.

In northern Idaho, the main activity is in the Clearwater and Idaho Panhandle National Forests and on adjacent state and private lands. Major infestations were found in the drainages of the North Fork of the Clearwater River, the

Palouse River east of Potlatch, the Coeur d'Alene River system east of the town of Coeur d'Alene, and in many scattered but intense groups from Rathdrum to Bonners Ferry (Appendix Map) on state lands administered by the Pend Oreille Lake Supervisory Area. In this area, intense salvage programs and increased harvesting of highly susceptible, high risk green stands are helping to avoid excessive losses.

In southern Idaho Douglas-fir mortality caused by the Douglas-fir beetle continued to increase with 10,600 trees killed in 1987 compared to 5,100 trees in 1986. Increases in beetle activity occurred on the Boise, Payette, and Targhee National Forests. Activity was concentrated in the Shaefer Peak area along the Middle Fork of the Weiser River drainage on the Payette National Forest. While activity remained relatively static on the Caribou and Sawtooth National Forests, significant infestations are concentrated in the Scout Mountain and Portneuf Ranges on the Caribou National Forest. Elsewhere in southern Idaho, approximately 11,400 trees were killed southwest of Pocatello along the Deep Creek range on lands administered by the Fort Hall Indian Reservation, the State of Idaho, and the Bureau of Land Management.

Specific mortality figures as noted by aerial detection surveys are found in Table 1.

Spruce Beetle

In southern Idaho aerial and ground surveys indicated that approximately 725 mortality centers, containing approximately 16,500 trees, were present on the Payette and Boise National Forests in 1987 compared to 900 mortality centers and 13,900 trees in 1986. Aggressive salvage and trap tree programs in accessible commercial forest areas have reduced the total number of mortality centers while in untreated areas mortality centers continued to expand. Mortality was scattered throughout host type on the McCall, New Meadows, and Council Ranger Districts on the Payette National Forest and on the Cascade Ranger District on the Boise National Forest. Continued salvage and aggressive sales in susceptible green stands on State of Idaho lands has reduced losses to very low levels.

In northern Idaho, spruce beetle activity has dropped going from 240 trees in 1986 to 105 in 1987. Mortality figures from aerial detection surveys are found in Table 1.

Pine Engraver and Western Pine Beetle

In northern Idaho, mortality caused by the pine engraver increased significantly from 1986. Approximately 10,200 trees were killed in 1987 which is up from 1,700 in 1986 (Table 1). In many of these trees, the pine engraver was found in conjunction with the western pine beetle. An early spring which was unusually warm and dry probably contributed to this increase in pine engraver activity. Most of the mortality occurred in the Pend Oreille area, and the Mica and West St. Joe Fire Protection Districts. The western pine beetle has continued to increase in activity from 1986 to 1987. In northern Idaho, 372 trees were killed in 1986 and 1,256 in 1987. The majority of these trees, in both northern and southern Idaho, are second growth ponderosa pines. The

extreme warm and dry spring and summer conditions apparently are contributing to the buildup of this insect. The last time there was a major problem with this insect in the northwestern states was during a twenty-year drought in the 1920s and 1930s. Increased moisture returned in the early 1940s, and the beetle population declined until the present.

Tests, using semiochemicals (pheromones), are being conducted by the US Forest Service, Pest Management Region 4, Boise to develop management tools. The tests are including both attractants and repellents.

A significant increase in activity was also noted throughout southern Idaho. Pine engraver beetles mixed with western pine beetles killed 9,900 trees. Extensive mortality occurred in Boise Basin and throughout the South Fork of the Payette River drainage on the Boise National Forest, along Warm Springs Creek and the Middle Fork of the Payette River drainage on the Payette National Forest, and along Spring Creek, Cove Creek, and Humbug Creek on the Salmon National Forest. In Table 1, for southern Idaho, the figures for the pine engraver are actually for the pine engraver and the western pine beetle.

Fir Engraver

Fir engraver-caused mortality increased in northern Idaho from 4,149 trees in 1986 to 9,663 trees in 1987 (Table 1). Most of the damage occurred in the Mica and West St. Joe Fire Protection Districts, the Pend Oreille area, and the Clearwater/Potlatch Protective Association area.

Normally breeding in slash, windthrow, and trees infected with root disease, fir engraver populations increase as trees are stressed during periods of drought. The droughty spring of this year probably contributed to this year's population increase.

TABLE 1. IDAHO STATE-WIDE SUMMARY; ANNUAL BARK BEETLE MORTALITY BY REPORTING AREA: NORTH IDAHO

AREA	YEAR	-- MOUNTAIN PINE BEETLE -- ESTIMATED MORTALITY			-- DOUGLAS-FIR BEETLE -- ESTIMATED MORTALITY			-- SPRUCE BEETLE -- ESTIMATED MORTALITY			-- PINE ENGRAVER -- ESTIMATED MORTALITY			-- FIR ENGRAVER -- ESTIMATED MORTALITY		
		ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME
BITTERROOT NF	1987	14	146	11.7	13	124	43.4	1	5	2.0	0	0	0.0	0	0	0.0
	1986	3,311	5,629	506.2	272	113	39.6	10	5	2.0	0	0	0.0	0	0	0.0
CATALDO	1987	501	1,507	135.6	100	145	50.8	0	0	0.0	0	0	0.0	35	50	10.0
	1986	500	1,000	90.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
CLEARWATER NF	1987	5	35	6.3	3,787	10,286	3600.1	0	0	0.0	54	170	4.3	199	735	147.0
	1986	40	35	3.2	35	165	57.8	10	5	2.0	0	0	0.0	0	0	0.0
CPTPA	1987	4	32	12.8	673	3,249	1137.2	0	0	0.0	4	35	0.9	285	1,224	244.8
	1986	4	16	1.4	298	1,228	429.8	0	0	0.0	0	0	0.0	2	5	1.0
CRAIG MTNS.	1987	3,203	18,878	1694.4	35	132	46.2	0	0	0.0	103	325	8.1	8	23	4.6
	1986	6,637	27,275	2450.4	22	56	19.6	0	0	0.0	79	70	1.8	0	0	0.0
IPNF'S	1987	951	2,281	270.4	7,694	13,843	4845.1	0	0	0.0	10	95	2.4	294	860	172.0
	1986	94	209	21.3	34	167	58.5	1	2	0.8	221	85	2.1	198	280	56.0
KENDRICK	1987	0	0	0.0	3	25	8.8	0	0	0.0	158	820	20.5	161	680	136.0
	1986	2	20	1.6	1	10	3.5	0	0	0.0	14	70	1.8	d 25	100	20.0
MAGGIE CRK.	1987	1	6	2.4	0	0	0.0	0	0	0.0	0	0	0.0	5	40	8.0
	1986	0	0	0.0	140	325	113.8	0	0	0.0	0	0	0.0	0	0	0.0
MICA	1987	0	0	0.0	2,352	14,105	4936.8	0	0	0.0	306	2,817	70.4	523	1,981	396.2
	1986	2	7	0.6	20	40	14.0	0	0	0.0	149	525	13.1	193	549	109.8
NEZ PERCE NF	1987	7,478	15,834	1425.2	92	419	146.7	0	0	0.0	20	150	3.8	3	22	4.4
	1986	5,953	9,313	848.5	1,142	1,554	543.9	227	228	91.2	3	34	0.9	d0	0	0.0
PEND OREILLE	1987	0	0	0.0	60	560	196.0	0	0	0.0	378	3,645	91.1	112	986	197.2
	1986	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
PRIEST LAKE	1987	0	0	0.0	134	1,325	463.8	0	0	0.0	16	160	4.0	54	185	37.0
	1986	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
WEST ST.JOE	1987	1	10	4.0	282	965	337.8	15	100	40.0	535	2,045	51.1	708	2,877	575.4
	1986	0	0	0.0	345	610	213.5	0	0	0.0	361	930	23.3	1,666	3,220	644.0
N. IDAHO TOTALS	1987	12,158	38,729	3,562.8	15,225	45,178	15,812.3	16	105	42.0	1,584	10,262	256.6	2,387	9,663	1,932.6
	1986	16,543	43,506	3,923.2	2,309	4,268	1,493.8	248	240	96.0	827	1,714	42.9	2,084	4,154	830.8

TABLE 1. IDAHO STATE-WIDE SUMMARY; ANNUAL BARK BEETLE MORTALITY BY REPORTING AREA: SOUTH IDAHO

AREA	YEAR	-- MOUNTAIN PINE BEETLE -- ESTIMATED MORTALITY			-- DOUGLAS-FIR BEETLE -- ESTIMATED MORTALITY			-- SPRUCE BEETLE -- ESTIMATED MORTALITY			-- PINE ENGRAVER -- ESTIMATED MORTALITY			-- FIR ENGRAVER -- ESTIMATED MORTALITY		
		ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME	ACRES INFESTED	TREES	MBM VOLUME
BOISE	1987	3,494	4,518	289.2	3,373	5,027	713.8	607	669	319.8	5,578	7,907	79.1	0	0	0.0
	1986	5,539	4,248	271.9	1,305	1,715	243.5	922	1,095	523.4	1,452	1,935	19.4	0	0	0.0
CARIBOU	1987	130	182	11.6	1,148	1,262	179.2	0	0	0.0	0	0	0.0	0	0	0.0
	1986	4,224	4,628	296.2	1,218	1,415	200.9	25	35	16.7	0	0	0.0	0	0	0.0
CHALLIS	1987	15,759	4,730	302.7	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	1986	2,433	2,494	159.6	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
PAYETTE	1987	931	1,287	82.4	1,524	1,855	263.4	13,002	15,873	7587.3	1,282	1,364	13.6	0	0	0.0
	1986	1,150	734	47.0	227	301	42.7	12,993	12,600	6022.8	155	235	2.4	0	0	0.0
SALMON	1987	12,759	3,754	240.3	55	79	11.2	0	0	0.0	663	602	6.0	0	0d	0.0
	1986	564	852	54.5	95	133	18.9	45	63	30.1	110	155	1.6	0	0	0.0
SAWTOOTH	1987	9,200	11,609	743.0	1,016	1,200	170.4	0	0	0.0	55	53	0.5	0	0	0.0
	1986	4,233	4,620	295.7	1,062	1,202	170.7	35	49	23.4	55	77	0.8	0	0	0.0
TARGHEE	1987	350	735	47.0	1,227	1,220	173.2	0	0	0.0	0	0	0.0	0	0	0.0
	1986	622	738	47.2	225	348	49.4	35	25	12.0	0	0	0.0	0	0	0.0
S. IDAHO TOTALS	1987	42,623	26,815	1,716.2	8,343	10,643	1,511.3	13,609	16,542	7,907.1	7,578	9,926	99.3	0	0	0.0
	1986	18,765	18,314	1,172.1	4,132	5,114	726.2	14,055	13,867	6,628.4	1,772	2,402	24.0	0	0	0.0
STATE TOTALS	1987	54,781	65,544	5,278.9	23,568	55,821	17,323.6	13,625	16,647	7,949.1	9,162	20,188	355.8	2,387	9,663	1,932.6
	1986	35,308	61,820	5,095.3	6,441	9,382	2,220.0	14,303	14,107	6,724.4	2,599	4,116	66.9	2,084	4,154	830.8

DEFOLIATORS

Western Spruce Budworm

In northern Idaho, budworm defoliation increased both on the Bitterroot and Nez Perce National Forests (Table 2). The infestation on the Nez Perce NF, Salmon River District, has increased this year to over 14,000 acres of light and moderate defoliation. An egg mass survey conducted in August on the Nez Perce NF predicts an average of 29 percent defoliation over the sampled area for 1988 with as much as 46 percent in certain spots. Additional ground surveys are planned for the Nez Perce NF in 1988. On the Bitterroot NF, almost 37,000 more acres were defoliated in 1987 than in 1986.

The opposite trend occurred in southern Idaho. Defoliation on the Boise, Caribou, Challis, Payette, Salmon, Sawtooth, and Targhee National Forests declined from 2.9 million acres in 1986 to 834,500 acres during 1987. This 71 percent reduction in acres of detectable defoliation may be attributed to unseasonably warm spring temperatures followed by freezing temperatures resulting in widespread larval mortality. This decline in acreage of defoliation was accompanied by a decrease in intensity of defoliation. In 1986 areas classified as heavily defoliated accounted for 44 percent of the total defoliated acreage, while in 1987 less than 5 percent of the defoliated acreage was classified as heavily defoliated.

Table 2. Acres of western spruce budworm defoliation as determined by aerial surveys in 1987 and 1986.[1]

Forest and Adjacent Lands	Year	Defoliation Intensity: Light	Moderate	Heavy	Total	Change
Bitterroot	1986	9,434	2,880	0	12,314	
	1987	40,958	8,068	278	49,304	+ 36,990
Boise	1986	76,875	302,216	754,614	1,133,705	
	1987	337,400	58,000	31,300	426,700	- 707,005
Caribou	1986	47,018	141,105	88,795	276,918	
	1987	32,300	15,100	4,600	52,000	- 224,918
Challis	1986	32,571	2,258	0	34,829	
	1987	16,900	4,000	0	20,900	- 13,929
Nez Perce	1986	0	0	0	0	
	1987	11,028	3,383	0	14,411	+ 14,411
Payette	1986	61,768	193,957	362,550	618,275	
	1987	119,000	15,800	0	134,800	- 483,475
Salmon	1986	29,580	0	0	29,580	
	1987	60	540	0	600	- 28,980
Sawtooth	1986	60,667	162,788	131,336	354,791	
	1987	65,000	18,200	900	84,100	- 270,691
Targhee	1986	266,839	171,437	18,583	456,859	
	1987	104,400	9,200	1,800	115,400	- 341,459
TOTAL	1986	584,752	976,641	1,355,878	2,917,271	
	1987	727,046	132,291	38,878	898,215	-2,019,056

[1]Only portions of the national forests of southern Idaho were flown. Actual acreage figures are probably higher.

Larch Casebearer

Larch casebearer populations continue to be very low. Only 66 acres of defoliation were reported from aerial surveys, all of which were located in the Idaho Panhandle National Forest. Nineteen additional acres of defoliation were attributed to the larch sawfly. It is often difficult to determine the damaging agent causing larch needle problems during aerial surveys because larch needle diseases and insects closely resemble each other except at close examination. However, larch casebearer populations are still not commonly observed during ground surveys.

Douglas-fir Tussock Moth

Statewide, the Douglas-fir tussock moth is at very low levels. There was no aerially visible defoliation in 1987. All flight trap catches dropped considerably, many to zero or less than one moth per trap. The averages per trap site (Table 3) show a very significant drop in northern Idaho. Traps placed in the 1986 defoliation areas (designated as "Deary" in Table 3) had only an average of 2.2 moths per trap site. One home site in Coeur d'Alene sustained defoliation of white fir (Abies concolor) ornamentals. Several Colorado blue spruce at the USFS tree nursery in Coeur d'Alene were also defoliated.

In southern Idaho, survey results indicate decreasing or static populations on the Boise, Payette, Salmon, and Sawtooth National Forests. Trap catches in the Owyhee Mountains remained high.

Table 3.--Average Douglas-fir tussock moth pheromone trap catches in Idaho, 1980-1987.

Area	Number of Sample Plots	Means of average moth catch per 5 traps/sample plot							
		1980	1981	1982	1983	1984	1985	1986	1987
STATE & PRIVATE									
Sandpoint	2	0	0	.1	0	0	0	0	*
Coeur d'Alene	6	0	0	1.1	3.1	4.4	8.0	7.0	.2
Plummer-Moscow	15	0	.8	8.2	12.3	17.5	85.8	22.6	1.2
Plummer-Moscow	18	*	*	2.5	3.3	7.0	43.2	15.2	.3
Plummer-Moscow	13	*	*	*	4.3	9.0	35.2	14.6	.5
Plummer-Moscow	1	*	*	*	*	36.4	68.4	42.8	1.0
Plummer-Moscow	2	*	*	*	*	*	76.0	49.7	3.8
Plummer-Moscow	3	*	*	*	*	*	*	80.5	9.0
Craig Mountain	7	*	2.7	.5	.5	.6	.4	3.5	.1
Deary	15	*	*	*	*	*	*	*	2.2
NEZ PERCE NF									
Selway RD	4 (2 in 85)	.2	1.2	.7	.1	.1	0	.1	0
Slate Creek RD	5 (3 in 85-87)	0	1.6	2.8	.6	1.4	.3	.9	0
Slate Creek RD	6	*	*	1.3	.3	0	*	*	*
Elk City RD	3	*	*	.3	.1	0	*	*	*
Red River RD	2	*	*	0	0	0	*	*	*
Clearwater RD	3	0	0	0	0	0	*	*	*
Clearwater RD	4	*	*	.6	.6	.3	.3	*	*
CLEARWATER NF									
Lochsa RD	5 (2 in 85-87)	*	3.6	.2	0	0	0	.3	0
Canyon RD	8 (5 in 85-87)	*	*	8.7	*	*	.9	1.7	0
Pierce RD	18 (5 in 85-87)	*	*	.3	.1	.1	.6	4.0	.1
Potlatch RD	8	*	*	1.8	4.5	13.0	30.8	12.8	*
Powell RD	8	*	*	.3	.1	0	*	*	*
BOISE NF									
Cascade RD	2 (1 in 86 & 87)	*	.1	.3	20.0	0	1.0	1.2	.2
Mountain Home RD	2 (1 in 86 & 87)	*	*	.3	21.7	.4	0	1.2	1.4
PAYETTE NF									
Council RD	2 (5 in 86, 10 in 87)	*	*	43.3	38.2	6.7	5.1	21.2	7.4
McCall RD	1	*	0	.6	11.0	.5	*	*	*
Weiser RD	3 (5 in 86, 9 in 87)	*	*	43.3	42.1	8.1	4.1	15.2	5.2
SALMON NF									
Cobalt RD	2	*	*	0	2.6	0	*	*	*
North Fork RD	2	*	*	11.4	38.7	1.9	*	6.6	2.9
SAWTOOTH NF									
Burley RD	1	*	*	*	*	.2	*	*	*
Fairfield RD	3 (2 in 86, 4 in 87)	*	1.6	5.2	20.3	6.3	0	19.7	13.3
Ketchum RD	1	*	*	2.6	14.8	.8	*	*	*
OTHER FEDERAL									
Owyhee Mountains	2(4 in 86, 6 in 87)	27.8	55.8	*	*	10.8	.6	9.4	7.8
Sharps Canyon	1	*	19.4	16.2	41.2	1.3	5.2	22.6	8.4

* Indicates no traps were deployed

Gypsy Moth

Pheromone-baited survey traps captured 22 moths in 5 traps in Sandpoint, 11 moths in 2 traps in Coeur d'Alene, and 1 moth each in Lewiston and Cascade in 1987. This compares with a catch of one moth in Sandpoint in 1986. In Sandpoint and Coeur d'Alene, these catch numbers indicate the presence of reproducing populations.

Through discussions with personnel from the neighboring states of Washington and Oregon, it appears that we have not been using the optimum trapping design in our survey. To date, all traps have been placed at tourist attraction sites, campgrounds, ret stops, parks, etc. Our neighboring states have found that the greatest risk of introduction comes not from tourists, but with the movement of household goods, specifically outside articles and vehicles, as people from the northeast establish new residences in the west. Thus, the best sample design is to grid residential areas with the survey traps. If we had been using a grid pattern of trap placement in 1986, we would have discovered that there was a large population in Sandpoint, and we may have also found the population in Coeur d'Alene.

Initial surveys looking for egg masses were conducted in the fall of 1987 in Coeur d'Alene and Sandpoint. No egg masses or other signs of the moths were found at that time. More extensive searches are planned for the spring of 1988.

Western Pine Shoot Borer

Control efforts have continued for another year in designated ponderosa pine plantations of the Inland Empire Tree Improvement Cooperative. Since the efficacy of the pheromone strip/confusant technique has been well established (Dewey and others; paper in preparation) the decision was made to discontinue the counts of infested and noninfested terminals in the treated plantations. This year, 1987, was the second of a planned five-year treatment effort.

Sugar Pine Tortrix and Pine Needle Sheathminer

In northern Idaho, a few small infested spots were observed on the Nez Perce National Forest in lodgepole pine.

Isolated infestations continued to occur in lodgepole and ponderosa pine on the Boise, Payette, Sawtooth, and Targhee National Forests in southern Idaho. Heavily attacked trees are severely deformed resulting in loss of apical dominance.

Pine Butterfly

Pine butterfly defoliation was not observed anywhere in Idaho again this year. However, small numbers of adults were observed in ponderosa pine stands.

MINOR INSECTS

Gouty Pitch Midge

The gouty pitch midge has continued its high levels of activity in northern Idaho through 1987. The most seriously damaged trees are those 5 to 25 feet tall. Taller trees are often infested but do not seem to suffer as much damage. At sites of heavy populations, at least 50 percent of the branch terminals may be infested. In these situations the trees end up with a very poor crown. Occasionally trees are being killed.

Hemlock Sawfly

No defoliation due to hemlock sawfly was detected in 1987. In a ground survey of the area previously defoliated very few larvae were seen. Individual trees with heavy populations were found at several locations within the original 1985 defoliation area. No cocoons were found at any locations in 1987.

Cranberry Girdler Moth

Cranberry girdler moth populations continued to be monitored at the Coeur d'Alene Forest Service nursery in 1987. Moths were caught in pheromone traps from late May through September. Peak trap catches occurred during the last week of June with 544 moths caught in 12 traps. This was the highest population observed since 1984.

The nursery was treated from June 12 to August 26 with three applications of Diazinon to control adult moths and two applications of Dursban to kill larvae in the soil. In November, 28,000 Douglas-fir and larch seedlings were examined during the lifting process. Only two seedlings were found damaged by the cranberry girdler.

Balsam Woolly Adelgid

In northern Idaho, the balsam woolly adelgid has continued to increase in intensity in existing infested spots, and has spread to several new sites in 1987. Most of the infestation is still confined to the Palouse Ranger District of the Clearwater National Forest and adjacent private land. These infested spots have been characteristically located in subalpine fir stands growing in frost pockets at 2,600-3,000 feet in elevation. However, an isolated population was found on several grand fir trees on a ridge top at 3,550 feet elevation near Headquarters, Idaho. Due to the potential damage this insect could cause in grand fir stands, an extended survey covering both subalpine fir and grand fir stands is planned for 1988.

Cone and Seed Insects

Timber, Cooperative Forestry, and Pest Management, Missoula, Montana, cooperated once again with the Intermountain Forest and Range Experiment Station, Ogden, Utah, in treating western larch trees with Acecap^{R} implants at a study site in northern Idaho. The objective of this study is to protect developing

larch conelets from insect damage. Preliminary results indicate treatment effects are minimal on these insects.

At the Moscow White Pine Arboretum, cone moth and cone worm populations were again low in 1987. Seed bugs were present but damage was light. However, due to the high value of the white pine seed, one aerial application of Pydrin[R] was applied July 22 to protect new conelets. This year they had a bumper crop of 1,203 bushels harvested, which yielded 733 pounds of seed. Estimates for the 1988 crop are also good with 600 bushels expected. Insect populations will again be monitored with pheromone traps.

Cone production at the Coeur d'Alene white pine seed orchard was also good with about 500 bushels harvested. One treatment of Pounce[R] was applied July 23 for protection against seed bugs.

Forest Tent Caterpillar

Populations of this defoliator were high throughout northern Idaho. Damage was particularly noted along the Clearwater river near Orofino, along side drainages near Kendrick, and along Highway 95 from Coeur d'Alene to Moscow. The deciduous trees and shrubs at a rest area 8 miles north of Potlatch were almost completely defoliated. This year's unusually warm, dry spring probably contributed to the success of this insect.

Locust Borer

Approximately 124 black locusts within Boise were killed by the locust borer in 1987.

Spruce Bud Scale

Infestations of spruce bud scales have been detected on ornamental spruces scattered throughout northern and southern Idaho.

Magdalis Weevil

Minor defoliation was observed on ponderosa pine growing on Harris Creek Summit on the Boise National Forest.

Eurytomid Wasp

Infestations were noted in ponderosa pine plantations on the Boise National Forest.

Prescott Scale

In southern Idaho, infestations intermixed with pine needle sheathminer and sugar pine tortrix were noted in the Big Deer Creek drainage on the Sawtooth National Forest.

California Tortoiseshell

The California tortoiseshell has developed large populations in many areas of north Idaho. Forest travelers reported driving through "clouds" of butterflies. Defoliation of the principle host, Ceanothus velutinus, commonly known as shiny leaf ceanothus, snowbrush or buckbrush, was extensive west of Priest Lake. In the Lamb Creek, Binarch Creek, and Pelke Divide areas approximately 3,200 acres were defoliated. Further north approximately 600 acres were defoliated in the headwaters of Blacktail Creek, and 200 acres on South Fork Creek, 300 acres on Ledge Creek, and 800 acres in Rock and Lime Creeks--all drainages of Upper Priest River. Another approximate 300 acres were defoliated in the Gold Creek drainage of the St. Joe National Forest, Avery District.

DISEASES

ROOT DISEASES

Root diseases are widespread throughout many different forest types in Idaho. Losses are especially severe in the north where mixed-conifer stands are attacked by several root disease fungi. Major root diseases include armillaria root disease, laminated root disease, annosus root disease, brown cubical root and butt rot, tomentosus root disease, and black stain root disease. Several root pathogens may occur together on the same tree and are often associated with bark beetle attacks. Major hosts in Idaho include Douglas-fir, grand fir, hemlock, Engelmann spruce, and subalpine fir. We have also observed root disease in young ponderosa pine plantations associated primarily with the death of improperly planted trees.

Armillaria root disease is widespread throughout the state. In some stands it appears as an aggressive disease causing rapid tree mortality. In other instances, particularly in southern Idaho, the fungus is often a weak pathogen capable only of killing stressed trees. Taxonomic research is continuing to gain insight into this complex species. So far, at least five distinct biological groups of armillaria have been observed and additional work is proceeding to determine relationships with pathogenicity.

Brown cubical butt rot is common throughout the state, particularly in stands of old-growth Douglas-fir and ponderosa pine. Infected trees often exhibit a slow decline as small feeder roots are killed. Seriously affected trees are often attacked and killed by bark beetles or other more aggressive root diseases.

Tomentosus root disease is frequently detected in roots of windthrown or up-rooted Douglas-fir throughout southern Idaho and occasionally in subalpine fir in southwestern Idaho. It is also been found in association with armillaria and laminated root diseases in north Idaho.

Occurrence of annosus root disease is apparently much more widespread in northern Idaho than previously believed. Recent evaluations on the Clearwater and Nez Perce National Forests indicated that several stands with typical armillaria root disease symptoms actually had high incidence of annosus root disease. Occurrence was especially severe on Douglas-fir, an infrequent host elsewhere in the western United States. Annosus root disease has long been associated with sapling and pole-size pine mortality in the state. It is possible that the fungus enters young pine stands by infecting freshly-cut stumps from the previous crop. Partial cutting or thinning of infected stands may accelerate root disease losses if stump infection is common. It is important that proper diagnosis of causal organisms be made when formulating procedures for reducing root disease losses.

Several projects have been initiated to gain additional information regarding root disease in a variety of stand situations. The status of these projects is summarized below.

A cooperative project in a young ponderosa pine plantation was established during May of 1985 as the stand was being precommercially thinned. A cluster of three permanent plots was established in the thinned area and another three-plot cluster was established in an area left unthinned as a control. Even though chlorotic and red ponderosa pine can be seen scattered throughout the area, the actual number of dead and dying ponderosa pine is relatively small compared to the total number of live trees. Two types of random transects were also established to obtain mortality information. Both of the transect methods found ponderosa pine mortality rates of 2-3 percent per year. Annual monitoring will be continued to see if the mortality rate will taper off as expected.

Another project was initiated in precommercially thinned stands comprised primarily of Douglas-fir and grand fir. Nearly 50 plots were randomly established in stands thinned in 1974 and 1979, and a few check plots were placed in unthinned portions of stands nearby. Preliminary results indicate that about 4 percent of the Douglas-fir and grand fir on the plots have been killed by root disease within the past five years. However, over 22 percent of the Douglas-fir and grand fir in the stands thinned in 1974 have active root disease infections while an average of 17 percent of these species were infected in the 1979 thinnings and only 12 percent in the unthinned area. Most of these infected trees exhibited no obvious symptoms, and the infection was frequently confined to a small basal wound.

A project dealing with mature stands was initiated in 1981 when more than one hundred 1/20th-acre plots were established in 17 root disease centers in north Idaho timber stands. All trees on each plot were monitored annually for five years, and photo points were established to provide comparisons of crown and basal symptoms on the plot center trees. Over 75 percent of the plot center trees died within the five-year monitoring period. Although most trees with obvious symptoms can be expected to die within five years, there was no apparent correlation between death and intensity of symptoms. There also seems to be little, if any, correlation between crown and basal symptoms.

A project to monitor mortality in three compartments of the Fernan Ranger District (Idaho Panhandle National Forests) was established in 1985 and has been re-examined annually for three years. Annual mortality rates have fluctuated considerably for western larch, ranging from 0.7 percent to nearly 3 percent per year. Douglas-fir and grand fir mortality rates have remained constant at about 4 and 2 percent per year, respectively. The rate of mortality of Douglas-fir killed by root diseases is greater than that of western white pine killed by blister rust (2.5% per year).

Another project was started in 1987 on the Lochsa Ranger District of the Clearwater National Forest. Permanent plots were established over a 17,000 acre compartment. Mortality due to all causes will be monitored on an annual basis similar to the Fernan project.

These projects will be used to develop a root disease hazard-rating system which will provide needed information for planning harvest activities. It will help to identify stands which are losing the greatest volumes of timber. These stands can then be scheduled for harvest to minimize root disease losses. Information from hazard ratings will also be used to assess root disease impact over large areas and adjust productivity projections for stands and compartments. Additionally, the Fernan project includes many stands which are scheduled for commercial thinning. They will be monitored following thinning to evaluate the effects of thinning on mortality rates.

FOLIAGE DISEASES

Ponderosa Pine Foliage Diseases

Elytroderma needle cast is a perennial problem in ponderosa pine stands throughout the state. It rarely causes much concern, but during the past few years, the pine stands around Little Donner Pass north of Cascade, Idaho, showed extensive damage. These trees had been heavily defoliated from 1983-1985 by the pine butterfly which may be contributing to the severity of the needle cast damage observed now. Many of these trees are also being attacked by bark beetles.

Occurrence of "greybeard," a needle disease of unknown identification, continued in many stands with a large amount of ponderosa pine. Damage was again prevalent around Idaho City.

Photo points were established last year in the Cascade and Idaho City areas to monitor severity of infection of these two diseases and comparisons showed that 1987 infection levels had subsided substantially in Cascade and to a lesser degree in the Idaho City area.

Douglas-fir Foliage Diseases

Epidemic infection levels of rhabdocline needle cast were noted on Douglas-fir throughout southern Idaho in the fall of 1987, indicating severe defoliation is expected at the beginning of the 1988 growing season. Mortality of heavily

defoliated seedling- and sapling-sized trees previously stressed by budworm defoliation, and the 1987 drought is expected in 1988. Infection levels of rhabdocline needle cast in northern Idaho continues to be low.

Swiss needle cast was more frequent than rhabdocline in northern Idaho, but only of minor importance in the southern part of the state. Damage was especially important in stands managed for Christmas tree production, although overall severity of the disease was not great.

Lodgepole Pine Needle Cast

Damage from lodgepole pine needle cast was very low in 1987. The warm, dry weather conditions during much of the growing season kept infection at a very low level.

Larch Foliage Diseases

Damage from both larch needle cast and needle blight was quite low during 1987. Warm, dry weather conditions prevailing during much of the growing season were probably responsible for the low occurrence of these diseases. A few areas of light infection were seen from the air, and occasional heavily infected trees were observed.

STEM AND BRANCH DISEASES

Stem and branch diseases of forest trees are not closely monitored because change in incidence is difficult to detect from one year to the next. Diseases of minor importance, whose status has not changed significantly, are noted in the summary table at the end of this report.

Dwarf Mistletoes

Dwarf mistletoes attack most conifer species throughout Idaho. Severe infections can reduce tree growth, wood quality, and cone crops and may predispose trees to attack by other agents. Aerial detection surveys do not include dwarf mistletoes because light infections cannot be seen, and dense stands frequently mask even heavily infected trees. Although mortality is rare, growth reduction in heavily infected stands may be substantial. In many situations, losses can be greatly reduced by silvicultural practices.

Each year more ranger districts develop long-range plans for dwarf mistletoe suppression. Primary interest is in protecting partially or fully regenerated stands threatened by a heavily infected overstory.

Dwarf mistletoe management considerations are incorporated into most long-range plans and silvicultural prescriptions for timber management throughout the region. Concurrently, dwarf mistletoe suppression projects are conducted to "clean up" a diminishing acreage of previously harvested stands in which infected trees were left and now overtop established regeneration. The dwarf

mistletoe management program is a process of education, presuppression survey, evaluation, control, and post-control evaluation. Accomplishments for 1987 are reported in Table 4.

Table 4. Dwarf mistletoe accomplishments - southern Idaho, 1987.

National Forest	Presuppression Survey Acres	Suppression Project Acres	Post-Suppression Evaluation Acres
Boise	24,400	550	60
Caribou	0	465	0
Challis	50	165	135
Payette	4,100	360	0
Salmon	11,500	287	200
Sawtooth	59	59	118
Targhee	20,000	714	1,400
TOTAL	**60,109**	**2,600**	**1,913**

An evaluation was made on the Flathead Indian Reservation in Montana that has implications for dwarf mistletoe management in Idaho. Beginning in the 1970s, highly infested stands, those with one third or fewer of the stems infected, were targeted for uneven age management. All visibly infected trees of merchantable size were cut during the first entry. Infected precommercial trees were removed during the first entry. Infected precommercial trees were removed during a follow-up precommercial thinning. The intent was to remove any missed trees and newly infected trees in subsequent stand entries. However, a 1987 evaluation showed that many trees were infected 8-10 years following treatment; too many to remove in the next entry. In some stands, 30-60 percent of the Douglas-fir and/or western larch were infected. Some trees were severely infected, with dwarf mistletoe intensity ratings of 4, 5, and 6 based on the 6-point rating system. The apparent cause of failure was an inability to reliably distinguish infected trees at the time of treatment. Many trees that appeared free of infection were in fact severely infected. Release of these trees following partial cutting stimulated the dwarf mistletoe to form brooms which then became apparent. The Flathead Reservation is currently in the process of revising prescriptions for dwarf mistletoe infested stands.

White Pine Blister Rust

Occurrence of white pine blister rust remains a severe handicap in managing western white pine throughout northern Idaho. Losses from this disease have continued to decline as harvested stands have been regenerated with more resistant white pine stock and mixtures of other species. The western white pine management guide, compiled by TCFPM, the Intermountain Station, and the

Clearwater National Forest, will be available soon. Recent evaluations of pruning and excising cankers in young, high value white pine stands have found that these techniques can be cost effective in reducing the impact of this disease in some stands.

Miscellaneous Stem Cankers

Western gall rust occurs throughout the state on ponderosa and lodgepole pine. It frequently kills young trees or may develop large stem cankers in older trees. Old stem cankers cause severe stem weakening which may render trees hazardous in recreation areas. Atropellis canker was observed on lodgepole pine in isolated areas, particularly in northern Idaho.

Dasyscypha canker was observed occasionally on sapling-sized pines in southern Idaho, especially those stressed by other agents. It may also be involved in causing cankers and subsequent top kill in pole-sized Douglas-fir in some areas of northern Idaho.

Cytospora canker caused branch dieback on several hardwood species in southern Idaho and was also a factor in top kill and branch dieback of a grand fir progeny test site in the Clearwater area.

MISCELLANEOUS DISEASES AND PROBLEMS

Dutch Elm Disease

The city of Boise, Idaho, has a street-tree population of less than 2,000 elm trees. In spite of an annual spray program for elm leaf beetles, 16 trees succumbed to dutch elm disease in 1987. The long-range plan for the city is to replace elms with tree species requiring less maintenance and resistent to dutch elm disease.

Decays

Indian paint fungus is the major cause of defect in mature true fir and hemlock in overmature stands throughout the state. A model to predict impact of this disease in grand fir stands developed for the Blue Mountains of Oregon will be tested in 1988 for its applicability in stands in north-central Idaho.

Red ring rot is widespread in pines, larch, Douglas-fir, and spruce in Idaho. However, amount of damage varies widely throughout the state.
Aspen canker and trunk rot are common in many aspen stands throughout Idaho. Damage is most severe in older stands.

Weather Related Problems

Late spring frosts caused discoloration, distortion, and mortality of newly emerging shoots and needles on ponderosa pine and Douglas-fir in several areas west of Council, Idaho.

The drought of 1986 continued through 1987. While this weather may have resulted in a decline in needle diseases which generally require moisture, the lack of moisture greatly increased the incidence of other pest problems which thrive on stressed trees. This trend is expected to result in a higher bark beetle and root rot mortality in 1988.

NURSERY DISEASES

Fusarium Root Disease

Fusarium root disease remained one of the major problems of containerized seedling production in northern Idaho forest tree nurseries. Several species of Fusarium have been identified as commonly associated with and capable of causing damping-off of young germinants and root disease of older seedlings. The two most common species are F. oxysporum and F. acuminatum. Strains of both species include pathogens and saprophytes. Occurrence of Fusarium on the roots of non-diseased containerized seedlings is quite common. Conditions which promote disease development from these infections are being investigated. Fusarium spp. commonly reside within and are often transmitted from one crop to another on containers. Standard procedures used to clean containers do not eliminate Fusarium within them. Additional tests are planned to evaluate techniques of reducing container-borne inoculum.

Losses from Fusarium-associated damping-off and root diseases were higher than normal in the spring western larch container crop at the USDA Forest Service Nursery in Coeur d'Alene. Almost 27,000 seedlings were estimated lost from these diseases.

Tests to reduce amounts of Fusarium on and within conifer seed indicate that running water rinses, hot water treatments, and a rapid soak in concentrated ethanol can be effective. Exact exposure periods required for adequate cleaning without reducing germination are still being formulated.

Evaluations are being conducted to determine the fate of Fusarium spp. on the roots of non-diseased containerized seedlings following outplanting. On one site in northern Idaho, Fusarium was found still colonizing some roots one year after outplanting but was not associated with any seedling mortality that occurred on the site. In another outplanting for tree improvement purposes on a non-forest site, Fusarium was responsible for scattered Douglas-fir seedling mortality one year after outplanting.

Evaluations are also planned to develop more satisfactory methods for controlling Fusarium diseases of conifer seedlings. Approaches include chemical, biological, and cultural treatments.

Mortality of large numbers of 1-0 ponderosa pine seedlings from several seed sources was noted at the US Forest Service Lucky Peak Nursery, Boise, Idaho. Fusarium oxysporum and an unidentified Fusarium sp. were consistently isolated from roots of affected seedlings.

As summer temperatures increased, patchy mortality of 2-0 Engelmann spruce seedlings was noted. Seedlings several inches away from initially observed mortality either died or root systems were distorted due to root mortality. However, mortality patches did not continue to expand late into summer. Fusarium oxysporum and a very fast growing Pythium sp. were consistently isolated from diseased roots.

Grey Mold

Grey mold continued to cause losses primarily of containerized seedlings during the latter portion of production cycles and during storage. Because this disease causes most damage to western larch in the northern Rocky Mountains, investigations were conducted to elucidate the infection biology of the fungus on this species. The primary goal of the work was to formulate more effective control measures. Preliminary work indicates that the fungus can penetrate needles directly and that older senescent needles are much more easily infected. Residual deposits of commonly used fungicides on needle surfaces affect spore germination and infection processes. Extent of these effects appears related to pesticide formulations and concentrations.

Meria Needle Cast

This disease was effectively controlled in bareroot western larch seedlings at the USDA Forest Service Nursery in Coeur d'Alene by application of protective fungicides. Warm, dry weather during periods of potential infection also contributed to low disease incidence.

Sirococcus Tip Blight

This disease was again located on containerized Engelmann spruce seedlings at the USDA Forest Service Nursery in Coeur d'Alene and infrequently on bareroot pine and spruce seedlings at several nurseries in northern Idaho. Fungicide applications have helped keep losses from this disease at relatively low levels.

Diplodia Tip Blight

This disease was common on 1-0 bareroot ponderosa pine seedlings at a nursery east of Lewiston. The disease is controlled by applications of chlorothalonil during periods of susceptibility during the spring and early summer. Proper fungicide applications the first year reduces chances for losses during the second growing season.

Phoma Blight

This disease was encountered periodically on bareroot pine seedlings at several nurseries in northern Idaho. Affected seedlings displayed tip dieback symptoms. Disease incidences were not sufficiently high to warrant special control efforts.

Pythium Root Disease

Root disease of containerized western white pine seedlings associated with a Pythiaceous-type of fungus was detected. The associated fungus, which has not yet been identified, rapidly decays lateral roots of affected seedlings, although foliar symptoms are not common. Diseased seedlings are discovered only during extraction from containers.

Transplanted container Engelmann spruce which became chlorotic following planting were often infected with Pythium (and Fusarium) at the USDA Forest Service Nursery in Coeur d'Alene. Although seedling mortality was not common, affected seedlings were not growing well and were very chlorotic; seedlings were most affected near irrigation lines.

Soil Fumigation

Tests to evaluate the efficacy of Basamid Granular as an alternative to soil fumigation with methyl bromide/chloropicrin continued at the USDA Forest Service Nursery in Coeur d'Alene. Differences in soil pathogen populations, amounts of disease, and seedling emergence and establishment have been detected. Final effects on seedling survival and quality will be evaluated during 1988.

STATUS OF MINOR DISEASES IN IDAHO

Disease	Host	Remarks
STEM AND BRANCH DISEASES		
Aspen trunk rot *Phellinus tremulae*	Aspen	Decay occurs in most aspen stands in southern Idaho.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, ponderosa pine	Infections occur infrequently on pine in southeastern Idaho and infrequently on ponderosa pine across southern Idaho.
Stalactiform blister rust *Cronartium coleosporiodes*	Lodgepole pine	This rust occurs in localized areas of host type across southern Idaho. Heavy infection has been noted in several areas.
Atropellis canker *Atropellis piniphila*	Lodgepole pine	Occurs sporadically throughout the regions of lodgepole pine. Some localized areas with severe infects have been observed near Grangeville.
MISCELLANEOUS FOLIAGE DISEASES		
Fir broom rust *Melampsorella caryophyllacearum*	Subalpine fir	Infection occurs scattered throughout the host type, but high infection levels have been noted in forested areas south of Twin Falls and Burley, Idaho.
Fir needle cast *Lirula* spp.	Subalpine fir, grand fir	Infected stands were found on the Council and Weiser Ranger Districts of the Payette National Forest.
Marssonina blight *Marssonina populi*	Aspen	Scattered incidence of light intensity was noted throughout the host range.
Spruce broom rust *Chrysomyxa arctostaphyli*	Engelmann spruce	Infection occurs scattered throughout the host type. It is common in eastern Idaho.

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